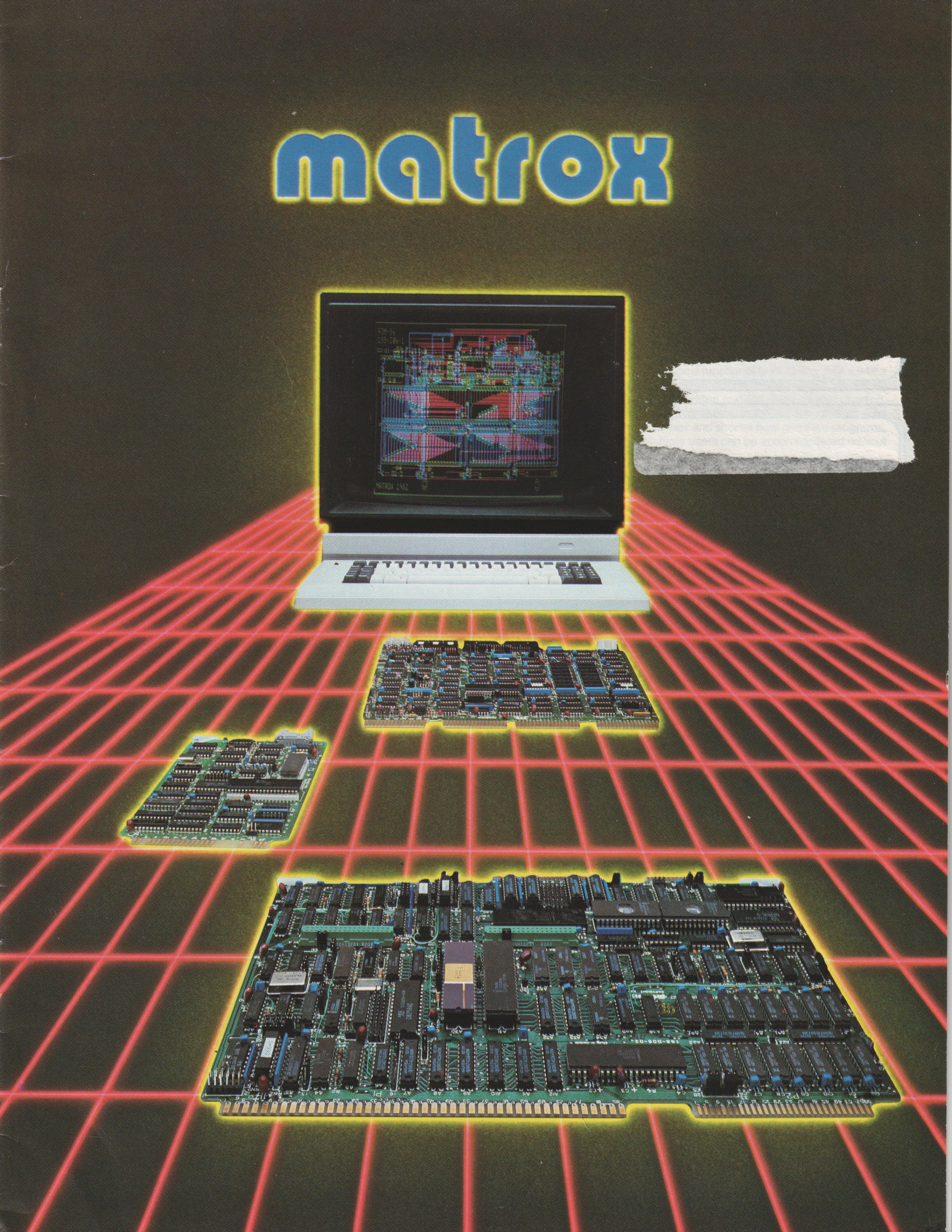
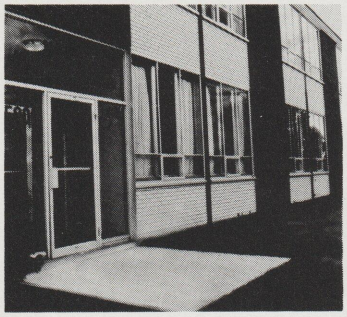
matrox





- Matrox Electronic Systems is a dynamic electronics company specializing in microcomputer displays and systems for OEM markets.
- Matrox is committed to maintaining its status as world leader in OEM CRT displays by continuously introducing new products based on the latest state of the art circuits.
- Our products offer quality, state of the art design, reliability, ease of interface, complete documentation, and support at a low price.
- We offer the widest range of display systems in the industry; from a simple IC controller chip to fully equipped 16-bit, microcomputer based, high performance display systems.

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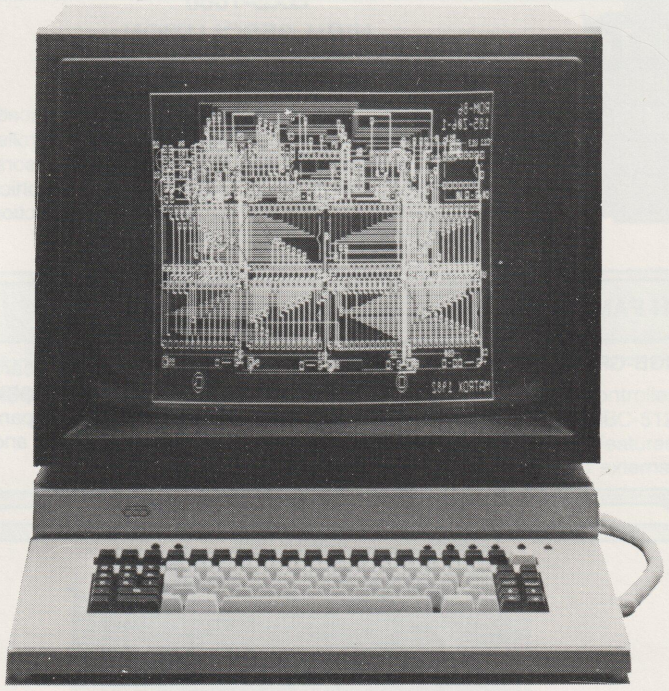
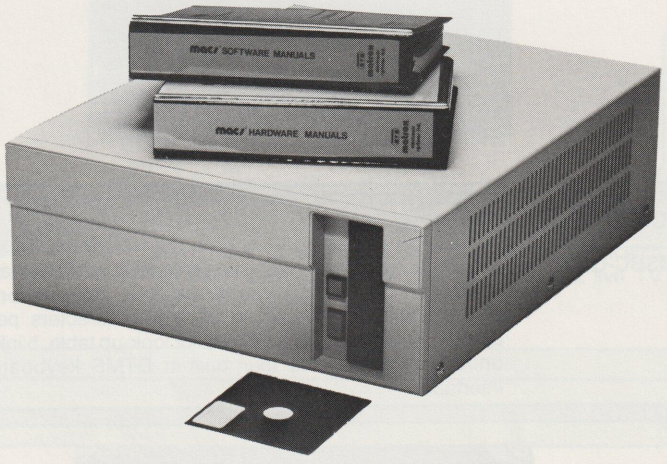


GXT-1000
HIGH RESOLUTION
COLOR GRAPHICS TERMINAL

The GXT-1000 is a high performance/low cost interactive color graphics terminal for use in single or multiuser CAD/CAM systems with micromainframe, supermini, or mainframe hosts. The GXT-1000 provides near real-time interactive response. It accepts picture data from the user's host computer via a serial or parallel communications line, and displays the image on a flicker free high resolution 19" color screen. The GXT-1000 provides a viewable resolution of up to 1280 x 1024 points, and each point can be displayed in one of 256 different colors.

The GXT-1000 provides exceptional local functionality including: 64K x 64K x 64K virtual display coordinates, multiple viewports, multiple surfaces, full 2D and 3D transformations, optional 3D hidden surface removal and shading, local picture segment storage, and graphics input device control. The benefits of local intelligence are simpler and shorter host graphics programs, and faster program execution. Multiple users can be accommodated without degrading the overall system performance.

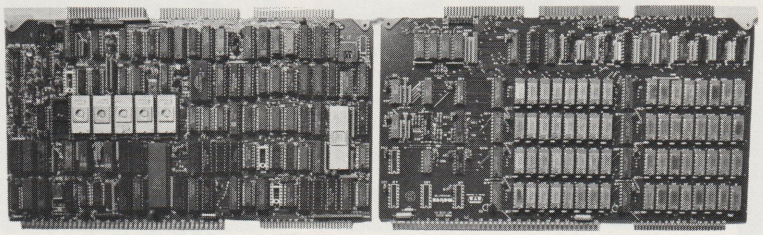


- **MACS-86**

16-bit OEM microcomputer system based on the industry standard 8086 (10 MHz) CPU. The system contains 640K bytes of dynamic RAM memory as well as a 1M byte floppy disk and a 20M Winchester disk drive. The MACS-86 is contained in a 9-slot Multibus card cage (available in either desktop or rackmount versions). Standard features include: RS-232C terminal interface, Centronics-compatible parallel printer interface, 6 expansion card slots, and automatic power-fail recovery with battery back-up for the system RAM. Software supplied with the system includes the industry standard CP/M-86 (or Concurrent CP/M-86), a ROM-based monitor program, and a diagnostics program for isolating system problems.

- **MACS-80**

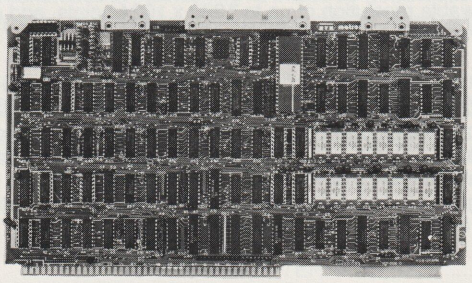
Powerful single-user microcomputer based on the industry standard Z-80A (4MHz) CPU. The system contains 64K bytes of dynamic RAM memory as well as a 1M byte floppy disk and a 20M byte Winchester disk drive. The MACS-80 is contained in a 9-slot Multibus card cage (available in either desktop or rackmount versions). Standard features include: RS-232C terminal interface, Centronics-compatible parallel printer interface, 7 expansion card slots, Software supplied with the system includes the industry standard CP/M2.2 a ROM-based monitor program, and a diagnostics program for isolating system problems.



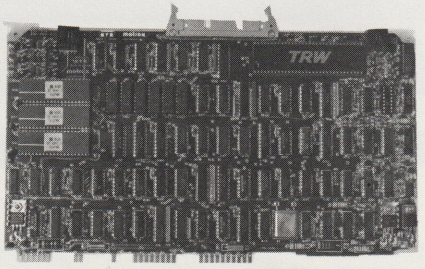
GXB-1000
HIGH RESOLUTION
COLOR GRAPHICS BOARD SET

1K x 1K x 16 non-interlaced (or 2K x 2K x 4 interlaced) 60Hz high performance color graphics display controller board set. This two board set features: four processors, high speed color look-up table, on-board Graphics Interpreter with a 256 command graphics instruction set, and a hardware vector generator.

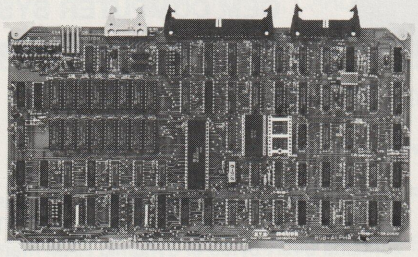
RGB-GRAPH FAMILY



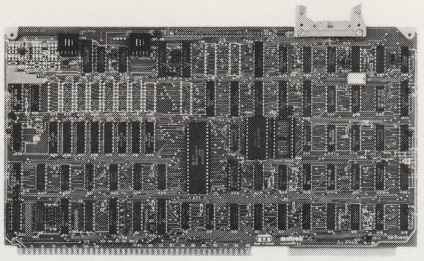
- **RGB-GRAPH** Color graphics display controller on a single board designed to generate 512 x 512 x 4 color graphic displays. Hardware features include; zoom, scroll, pan, memory clear, overlay, built-in memory, DMA, and expansion to 16 bits/pixel.



- **VAF-512** Video processor board adds high speed video processing to the RGB-GRAPH. Features include; 512 x 512 x 8 real time frame grabber, look-up table with over 16 million displayable colors, hardware vector generator.

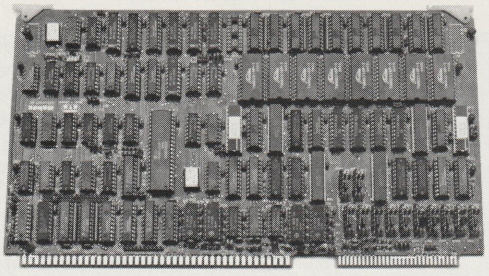


- **RGB-ALPHA** Color programmable format video display controller designed to generate up to 4000 characters in B/W grey scale or color. Features include; scroll, 256 user defined characters, and built-in keyboard and light pen interfaces. Can be combined with RGB-GRAPH color graphics board.

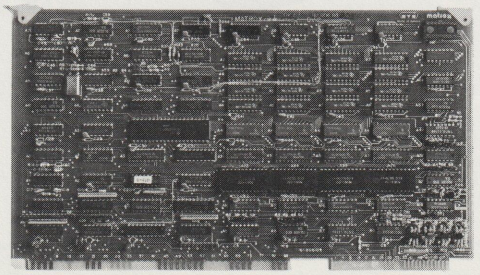


- **BW-ALPHA** Black/white programmable format CRT controller for displays of up to 4000 characters. Features include; scroll, programmable character attributes, addressable cursor, keyboard interface, and up to 48 lines with up to 132 characters/line.

QUAD VIDEO CONTROLLERS

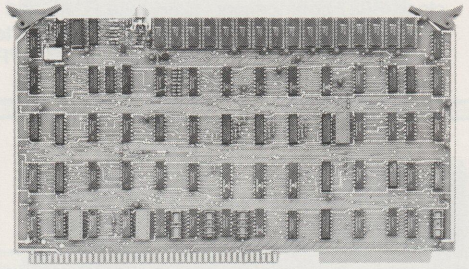


- **MSBC-QV3** Programmable format color alphanumeric video display controller designed to generate four independent displays with formats up to 24 x 80 characters per display. Features include; 256 color look-up table, blink, underline, scroll, and four built-in DTMF keyboard interfaces.

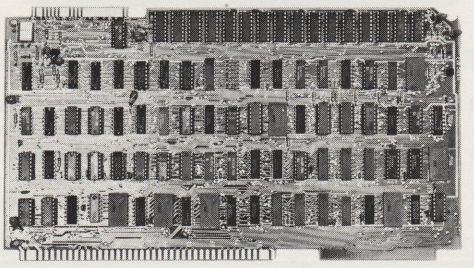


- **MSBC-QV2** Programmable format black/white alphanumeric video display controller designed to generate four independent displays. Features include variable character sizes, blink, underline, inverse video, and hardware scroll. The MSBC-QV2 requires only a single, low power, +5V supply.

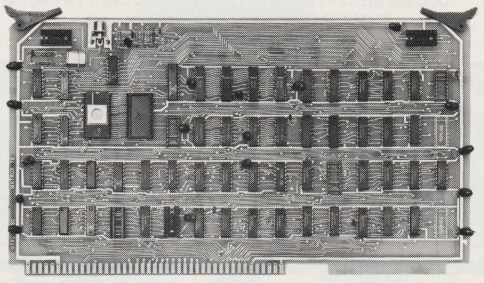
512 x 512 MONOCHROME GRAPHICS



- **MSBC-512** — Variable resolution, black/white graphics controller capable of generating up to 512 x 512 graphic displays. Features include; single command erase, vertical scroll, X-Y addressing.

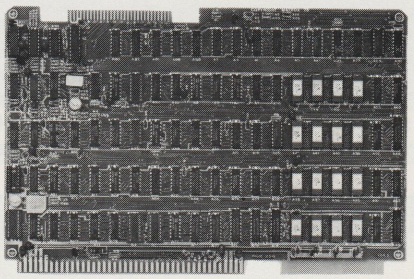


- **NSBC-512** — Variable resolution, black/white graphics controller which incorporates all the features of the MSBC-512 with the addition of high speed vector plotting. Features include; maximum 512 x 512 resolution, and external video data load.

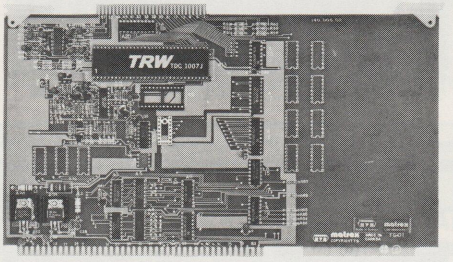


- **MSBC-2480** — 24 x 80 video display controller for displays of up to 1920 ASCII characters. Features include; built-in keyboard interface, user-selectable character attributes, and hardware scroll.

256 x 256 COLOR GRAPHICS



- **RGB-256** — 256x256x4 color graphics controller for 16 level grey scale or 16 color graphic displays. Features include; composite color output, expandable for more bits/pixel, image processing.



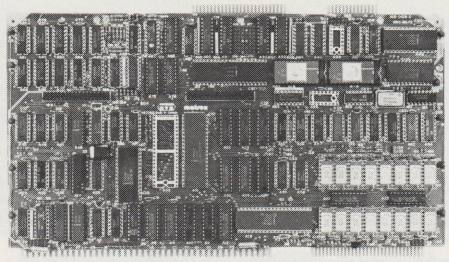
- **FG-01** — 256x256x8 frame grabber board, designed to work with the RGB-256. Allows the user to "freeze" a live TV frame in real time.

SOFTWARE

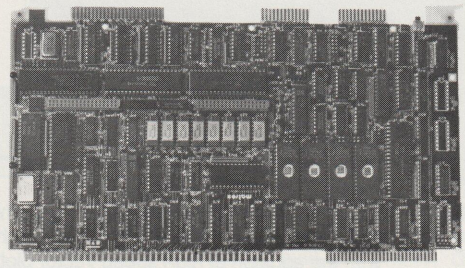
- **GRAS-80** — Graphics primitives library designed to support the RGB-GRAPH color graphics display controller in an 8-bit Z-80 based computer system running under CP/M. Supplied on an 8" floppy diskette, GRAS-80 enables the user to draw lines, circles, ellipses, and characters. Special functions include: zoom, scroll, pan, and advanced character manipulation.

SECTION 4

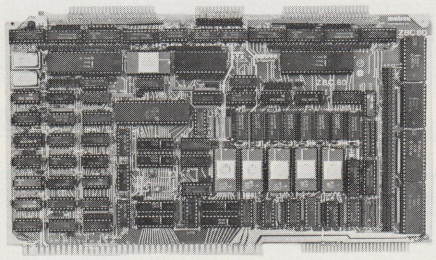
MULTIBUS CPU BOARDS



- **MBC-86/12A** — Single board 8086 based computer. Standard version is completely hardware compatible with Intel's iSBC-86/12A. Enhanced version runs with 10MHz clock, 8087 coprocessor, 128K byte RAM, and 2 iSBX expansion connectors. Features include; up to 128K on-board RAM, up to 32K on-board ROM/EPROM, 1 Megabyte addressing range.



- **PBC-80** — Z-80A based single board computer. Features include: 64K bytes of on-board dual port RAM, up to 96K bytes of on-board EPROM, 2 iSBX expansion connecters, 24 parallel I/O lines, 2 serial RS-232C ports, memory management capability, and 256 bytes of non-volatile RAM.

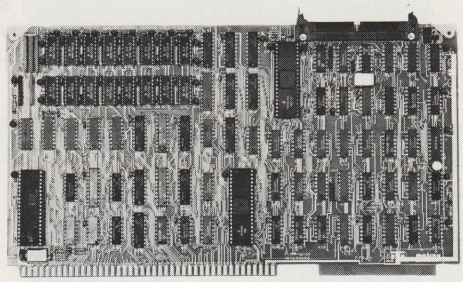


- **ZBC-80** — Single board Z-80A based computer which runs under the industry standard CP/M DOS. Features include: bootstrap-on-reset, up to 64K on-board RAM, up to 40K bytes ROM/EPROM.

SECTION 5

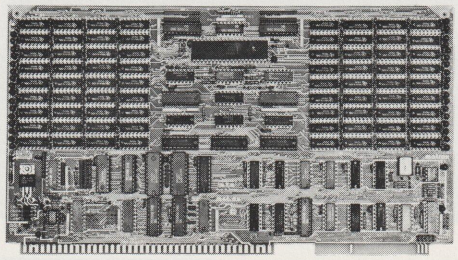
MULTIBUS MEMORY, DISK CONTROLLER, COMMUNICATIONS & ACCESSORY BOARDS

DISK CONTROLLER

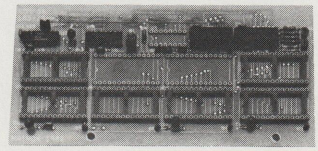


- **FFD-1** — Floppy disk controller/RAM card which provides up to 5 Megabytes of mass storage using 8" floppy disk drives. Features include: single/double density formats (IBM 3740/IBM System 34), 32K on-board RAM, single/multiple sector read and write, and DMA. Works with any 8 or 16 bit Multibus based computer.

MEMORY



- **MEGA-4** — 512K byte memory board works with both 8 or 16-bit computers. Features include: parity generating and checking, memory management, on-board transparent refresh. Available in 32K byte increments.

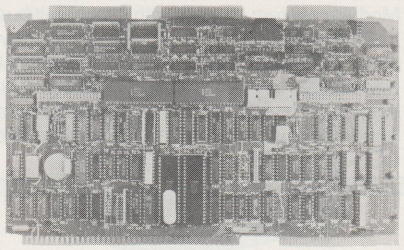


- **ROM-86** — ROM expansion module designed to enhance MBC-86/12A CPU board. ROM-86 contains up to 128K bytes of ROM/EPROM and up to 256 bytes of non-volatile RAM.

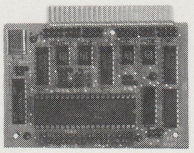
SECTION 5

MULTIBUS MEMORY, DISK CONTROLLER, COMMUNICATIONS & ACCESSORY BOARDS

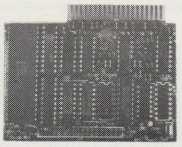
COMMUNICATIONS



- **COM-1** — High speed I/O communications board enables any Multibus system to communicate with a wide range of computers and peripherals using DMA. Interfaces include one 16 bit bi-directional parallel port, (800 Kbytes/sec compatible with a DEC DR-11W interface) as well as four RS-423 or RS-422 serial channels (300K baud). The COM-1 also includes a real-time clock with battery back-up.

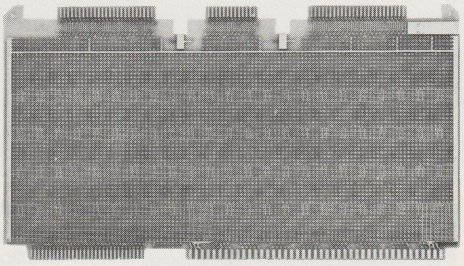


- **MSBX-423** — Serial communications expansion module designed to enhance the PBC-80 and MBC-86/12A CPU boards. The MSBX-423 provides two fully independent duplex serial channels. RS-232/423 compatible. Supports IBM Bisync and HDLC and SDLC protocol.

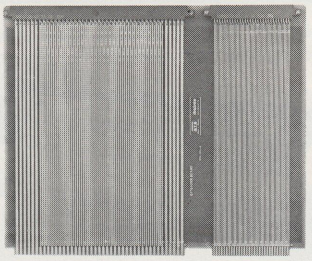


- **MSBX-422** — Serial communications single width iSBX module designed to enhance system serial I/O capabilities. The MSBX-422 provides a full duplex RS-449/422 compatible serial interface with a programmable baud rate generator. Supports IBM bisync and HDLC and SDLC protocols.

ACCESSORIES



- **PTB-2** — High quality wirewrap or solder prototype board. Features include: uncommitted power supply buses, large 6.5" height, holds over 120 ICs.

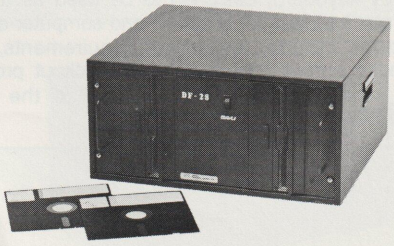


- **BEX-1** — Extender card. Features include: Multibus and auxilliary connectors, numbered pins, gold-plated edge contacts.

SECTION 6

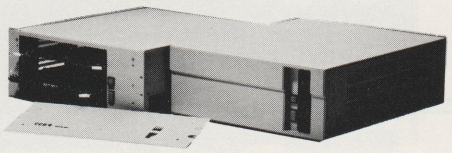
DISK DRIVES, CARDCAGES, KEYBOARDS

DISK DRIVES



- **DF-28** — Dual 8" floppy disk drives, compatible with the Matrox FFD-1 floppy disk controller. Features include: single or double density recording formats for up to 1.6 Mbytes of storage (double density). Rackmount or desktop versions are available.

CARDCAGES

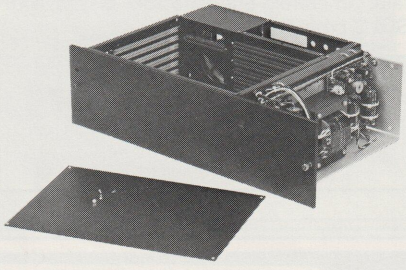


• CCB-9

Modular system chassis with 9 slot Multibus backplane. Features include: desktop or rackmount versions; 20, 40 or 60A power supplies; serial or parallel bus priority arbitration and power fail detection circuitry with battery back-up. An optional 20M byte Winchester disk drive and 1M byte floppy disk drive can also be added to the CCB-9.

• CCB-4

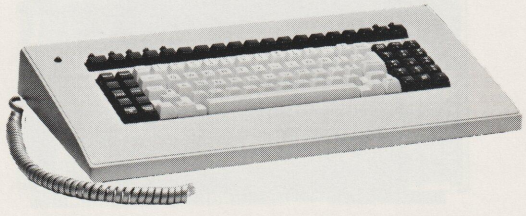
Multibus system chassis with 4 slot cardcage and built-in Multibus backplane. Features include: choice of 20 or 28A power supplies, front loading PC boards and double height top slot to accommodate piggy-back modules.



• CCB-7

Multibus system chassis with modular 7-slot cardcage with built-in Multibus backplane. Features include: choice of three power supplies, expansion to 21 slots, user defined front panel.

KEYBOARDS

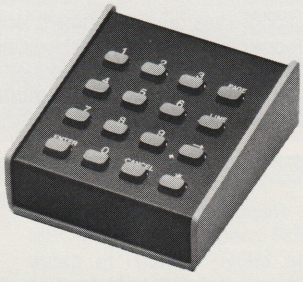


• KB-100

Serial keyboard designed to be used as an operator interface to graphics and alphanumerics terminals. Features include: 101 keys, 18 user function keys, 8 programmable LED indicator lamps, sonalert, N-key rollover, numeric keypad and a detachable coiled card. The KB-100 interfaces to the terminal via an RS-423 serial channel.

• KB-300

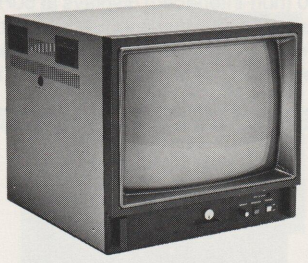
Parallel keyboard designed to be used as an operator interface to graphics and alphanumerics terminals. Features inlcude: 101 keys, 18 user-function keys, numeric keypad and N-key rollover. The KB-300 interfaces to the terminal via an 8 bit parallel port.



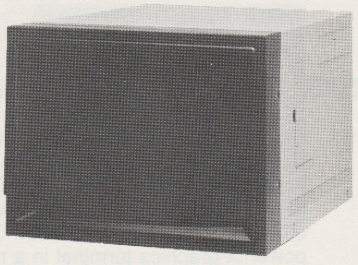
• KB-16

16 key keyboard, designed to be used as a remote operator interface for graphics and computer systems. Features include: low power requirements, DTMF encoded output, and double key lockout protection. The keyboard can be interfaced to the Matrox MSBC-QV3 controller.

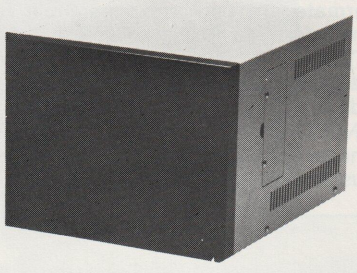
COLOR



- **MCM-2000L** 55MHz color monitor with 19" screen. 1024 x 1024 non-interlaced color displays.

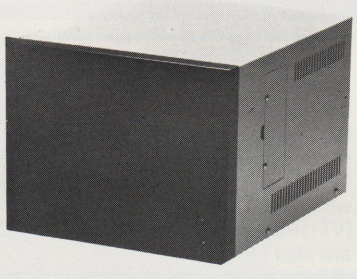


- **MCM-1000L** 40MHz color monitor with 19" screen. 1024 x 1024 interlaced color displays.

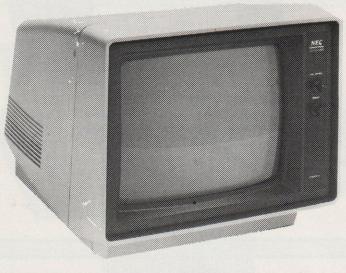


- **MCM-1014L** 40MHz color monitor with 14" screen. 1024 x 1024 interlaced color displays.

- **MCM-19L** 25MHz color monitor with 19" screen. High resolution with long persistence color phosphors.

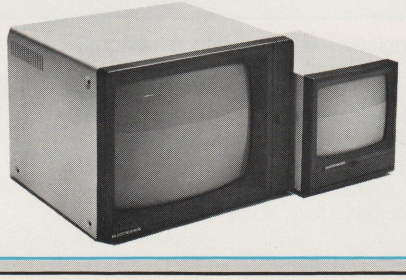


- **MCM-14L** 20MHz color monitor with 14" screen. High resolution with long persistence color phosphors.



- **MEC-12A** 18MHz color monitor with 12" screen. High resolution with .3mm dot pitch.

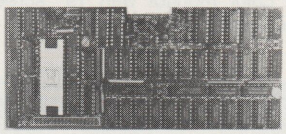
MONOCHROME



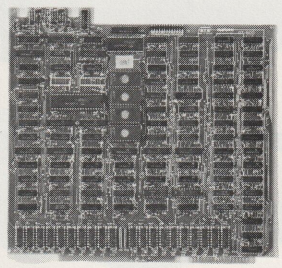
- **MCRT-9** 18MHz monochrome monitor with 9" screen. Available with P4 (white) or P39 (green) phosphors.
- **MCRT-14** 18MHz monochrome monitor with 14" screen. Available with P4 or P39 phosphors.

SECTION 8

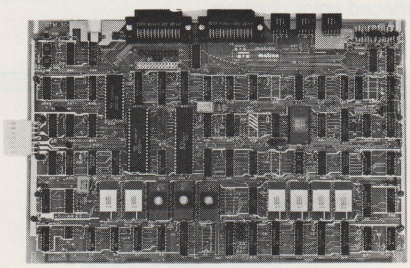
SPECIAL PURPOSE VIDEO BOARDS



- **MSBX-800** Color graphics display controller, contained on a double width iSBX expansion module, designed to generate 640 x 400 (non-interlaced) displays at 60Hz refesh rate. 4 bit planes enable displays using up to 16 different colors. Features include: on-board graphics processor, split-screen, pan, scroll, and a 4096 color look-up table.



- **GT-600A** Complete graphics terminal on a single board for upgrading the industry standard VT-100 alphanumeric terminal. Features include: 1024x256 or 640x480 resolution, on-board Z-80A with Tektronix 4016 emulator, RS-232C interface. Converts VT-100 into powerful graphics terminal in a matter of minutes.

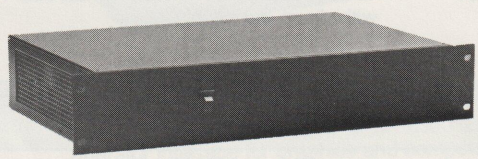


- **CTM-300/BRD** Color alphanumeric terminal controller board. Display formats are user programmable for up to 132 characters/line. Using an on-board Z-80A CPU, the CTM-300/BRD supports all the functions of an intelligent B/W terminal with the addition of color. In addition to the supplied firmware, which conforms to ANSI X3.64 (VT-100 compatible), the CTM-300/BRD's unique program download feature enables the user to customize terminal functions.

SECTION 9

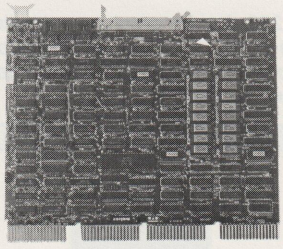
ALPHANUMERIC TERMINALS

- **CTM-300** 25x80 color alphanumeric terminal is a standard serially interfaced (RS-232C) ASCII terminal with an eight color CRT display. It is a high performance terminal with all the functions of an intelligent Black and White terminal plus color. It consists of a high resolution (.3mm pitch) 12" color monitor and a detachable 100-key keyboard with a built-in Z-80A. Firmware conforms to ANSI X3.64 (VT-100 equivalent). Printer and light pen interfaces are also included.

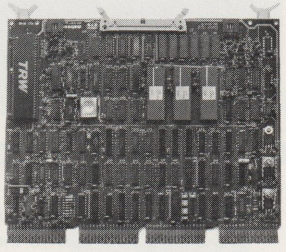


- **CTM-300/R** Rackmount color alphanumeric terminal controller. Contained in an EIA standard 19" rackmount package, the CTM-300/R supports all the functions of an intelligent B/W terminal with the addition of color. Features include: ANSI X3.64 command set, program download, light pen and printer interfaces.

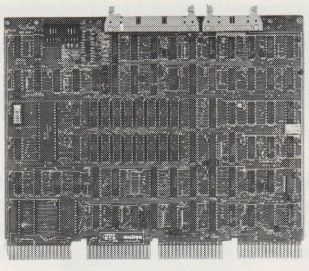
QRGB-GRAPH FAMILY



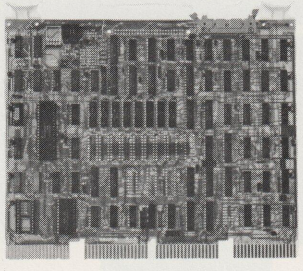
• QRGB-GRAPH Color graphics display controller on a single board designed to generate 512x512x4 color graphic displays. Hardware features include: zoom, scroll, pan, memory clear, overlay, built-in memory, DMA, and expansion to 16 bits/pixel.



• QVAF-512 Video processor board adds high speed video processing to the QRGB-GRAPH. Features include: 512x512x8 real time frame grabber, look-up table with over 16 million displayable colors, hardware vector generator.

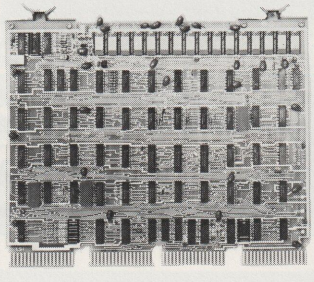


• QRGB-ALPHA Color programmable format video display controller designed to generate up to 4000 characters in B/W grey scale or color. Features include: scroll, 256 user defined characters, and built-in keyboard and light pen interfaces. Can be combined with QRGB-GRAPH color graphics board.

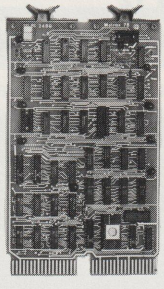


• QBW-ALPHA Black/white programmable format CRT controller for displays of up to 4000 characters (Quad size). Features include: scroll, programmable character attributes, addressable cursor, keyboard interface, and up to 48 lines with up to 132 characters/line.

512 x 512 MONOCHROME GRAPHICS



• MLSI-512 Variable resolution graphics controller capable of generating up to 512x512x1 graphic displays. Features include: single command erase, vertical scroll, X-Y addressing. Can be combined with MLSI-2480.



• MLSI-2480 24x80 alphanumeric video display controller board for LSI-11 based microcomputers (Dual size). Features include: normal/inverse video control, external/internal sync, can be combined with MLSI-512 for alpha/graph displays.

SOFTWARE

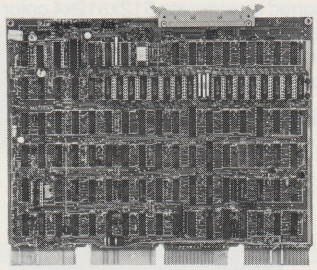
• QUARTO Graphics primitives library designed to support the QRGB-GRAPH color graphics display controller running under virtually any DEC operating system (RT-11 version 3B, RT-11 version 4, TSX, TSX-PLUS, RSX-11/M, UNIX V7). Supplied on an 8" floppy diskette, QUARTO enables the user to draw lines, circles, ellipses, and characters. Special functions include: zoom, scroll, pan, and advanced character manipulation.

• PLOT-512 Library of graphics subroutines designed to support the MLSI-512 or MDC-512 graphics display controllers running under RT-11 (version 2 or 3). Supplied on an 8" floppy diskette, PLOT-512 enables the user to draw points, lines and characters. Special functions include: automatic scaling, and labelling of axes.

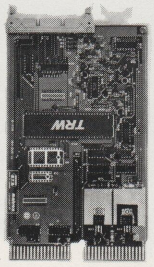
SECTION 10

Q-BUS (LSI-11) VIDEO BOARDS

256 x 256 COLOR GRAPHICS



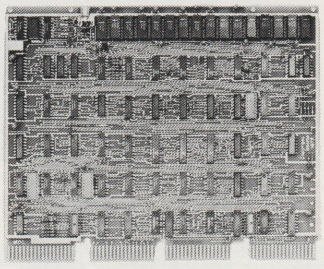
- **QRGB-256** — 256x256x4 color graphics controller for 16 level grey scale or 16 color graphic displays. Features include: composite color output, expandable for more bits/pixel, image processing.



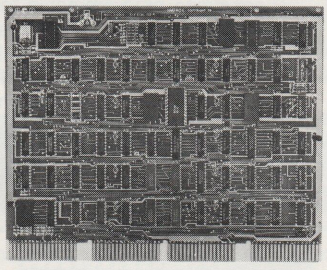
- **QFG-01** — 256x256x8 frame grabber board, designed to work with the QRGB-256. Allows the user to "freeze" a live TV frame in real time.

SECTION 11

UNI-BUS (PDP-11) VIDEO BOARDS



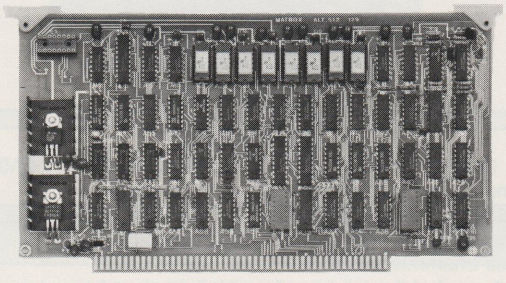
- **MDC-512** — Variable resolution graphics controller capable of generating up to 512x512x1 graphic displays. Features include: single command erase, vertical scroll, X-Y addressing. Can be combined with MDC-2480.



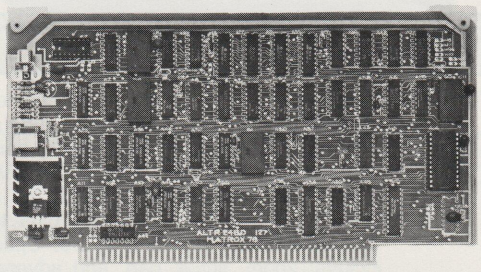
- **MDC-2480** — 24x80 alphanumeric video display controller board for PDP-11 based microcomputers. Features include: normal/inverse video control, external/internal sync. can be combined with MDC-2480 for alpha/graph displays.

SECTION 12

S-100 BUS VIDEO BOARDS



- **ALT-512** — Graphic display controller for up to 512x256 graphic displays. Features include: 512x256x1 or 256x256x2 resolution, single instruction erase, expansion for color/grey scale applications.



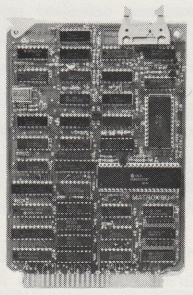
- **ALTR-2480** — 24x80 alphanumeric video display controller for S-100 based microcomputers. Features include: character blinking/inverse video, external/internal sync, can be combined with ALT-512 for alpha/graph displays.

SECTION 13

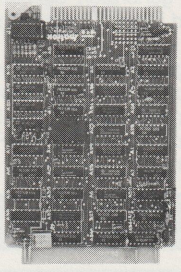
STD-BUS VIDEO BOARDS

AVAILABLE
4th QUARTER
1983

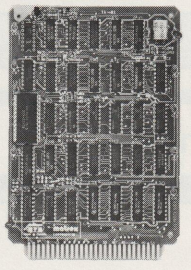
- **STD-800** Single board color graphics controller designed to generate 640 x 400 (non-interlaced) displays at 60Hz refresh rate. 4 bit planes enable displays using up to 16 different colors. Features include: on-board graphics processor, split-screen, pan, scroll, and a 4096 color look-up table. Multiple STD-800 boards may be combined to yield up to 12 bits/pixel (4096 simultaneously displayable colors).



- **STD-ALPHA** Programmable format CRT controller for displays of up to 2000 characters. Features include: scroll, programmable character attributes, and addressable cursor.



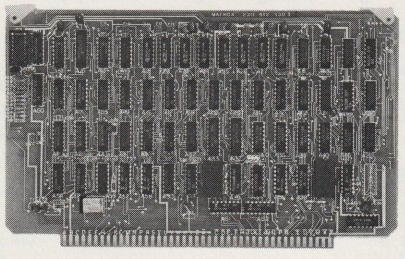
- **STD-256** Single board graphics controller for 256x256 graphics displays. Features include: CPU on/off video control, expansion for color/grey scale, expansion for higher resolution.



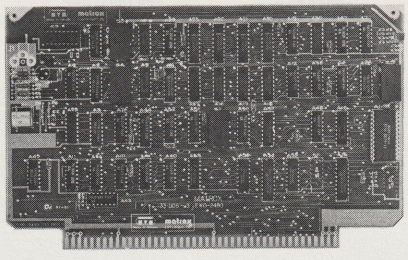
- **STD-2480** 24x80 alphanumeric video display controller board for STD-bus based microcomputers. Features include: normal/blink video control, external/internal sync, can be combined with STD-256 for alpha/graph displays.

SECTION 14

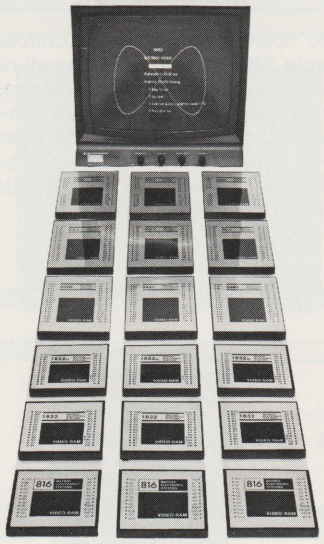
EXORCISOR BUS VIDEO BOARDS



- **EXO-512** Graphic display controller for up to 512x256 graphic displays. Features include: 512x256x1 or 256x256x2 resolution, single instruction erase, expansion for color/grey scale applications.



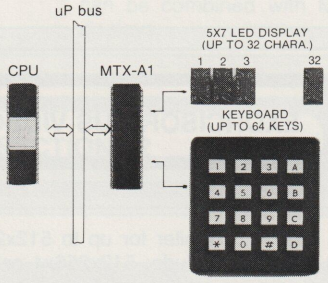
- **EXO-2480** 24x80 alphanumeric video display controller for S-100 based microcomputers. Features include: character blinking/inverse video, external/internal sinc, can be combined with EXO-512 for alpha/graph displays.



GENERAL PURPOSE PLUG-IN MODULES

The Matrox family of VRAM TV CRT controllers are designed for use in systems that require a display of alpha/graphic data. The family is packaged in small self-contained modules that can be soldered or plugged into the user's PCB. On the input side, a Matrox VRAM module looks like an ordinary 8-bit wide RAM and can be connected directly to the address and data bus of any bus organized system. The modules generate a composite video signal to drive any standard CRT display or TV monitor. These modules are particularly suitable for use in microcomputer systems due to their low cost, small, size, modular packaging, single +5V supply, and ease of interface.

- **MTX-816** 8x16 CRT controller for displays of up to 128 ASCII characters. Features include: bidirectional data bus, flicker free display, and electronic intensity control.
- **MTX-1632** 16x32 CRT controller for displays of up to 512 ASCII characters. Features include: flicker free display, character blinking, electronic intensity control, and upper/lower case characters within a 7x9 dot matrix.
- **MTX-1632SL** 16x32 CRT controller for displays of up to 512 ASCII characters. Features include: external synchronization, character blinking, and broadcast applications.
- **MTX-2064** 20x64 CRT controller for displays of up to 1280 ASCII characters. Features include: standard video output, character blinking, electronic intensity control, and upper/lower case characters within a 7x9 dot matrix.
- **MMD-2480** 24x80 CRT controller for displays of up to 1920 ASCII characters. Features include: external sync option, character blinking, and upper/lower case alphanumeric characters and limited graphics. Can be combined with MMD-256.
- **PV-1** Programmable format CRT controller for displays of up to 16x64 characters. Features include: programmable character generator, built-in digital and analog video mixer, and internal/external sync capability.
- **MMD-256D** 256x256 graphics controller which can be expanded for color graphics displays. Features include: 8 or 16 bit data transfers, expansion for higher resolutions. Can be combined with alpha VRAMs for alpha/graph applications.



ALPHA CHIPS — VLSI ICs for Alphanumeric LED Displays

Matrox family of single chip alphanumeric display/keyboard controllers that are intended to drive a variety of the displays presently available on the market, in either 5x7 dot matrix (MTX-A1) or 7,14, or 16 segment (MTX-B1) configurations. Many intelligent commands such as clear display, shift left/right, cursor control, blink, read/write, etc., are featured. Display parameters such as refresh rate, display length, etc., are user programmable. Typical applications for these controllers are: μP controlled instruments, POS terminals, and electronic scales. The chips are housed in a standard 40-pin package requiring a single +5V supply.

- **MTX-A1** Alphanumeric (dot) display/keyboard controller can interface with any 8-bit microcomputer to drive up to 32 5x7 dot matrix LED displays. Features include: 64 ASCII character set, built-in character generator, 64 key encoder.
- **MTX-B1** Alphanumeric (segment) display/keyboard controller can interface with any 8-bit microcomputer to drive up to 32 popular (from 7 to 16) segment displays. Features include: 16 segment character generator built-in, dual scan mode, common anode/cathode, and 64 key encoder.

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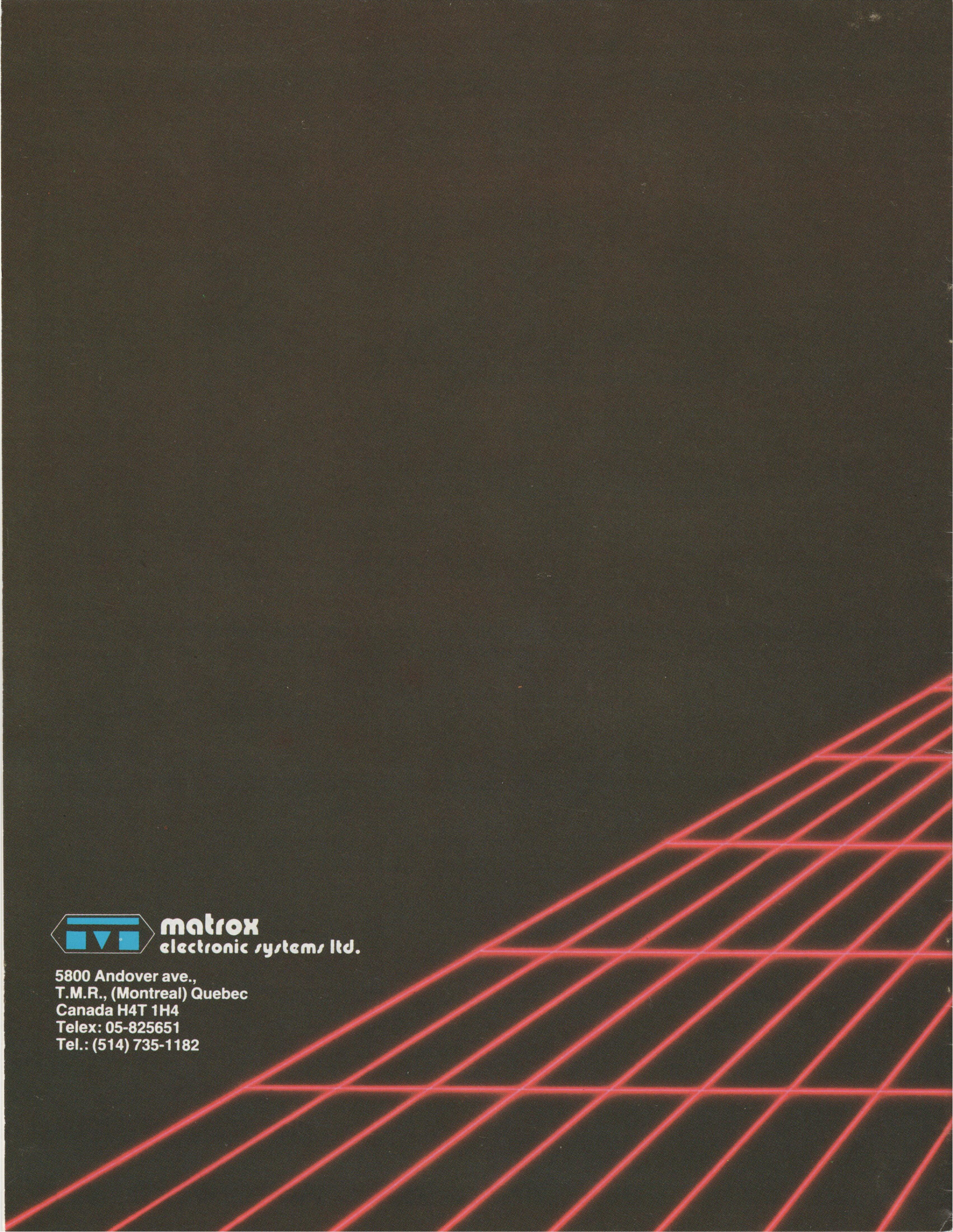

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